GB1199158

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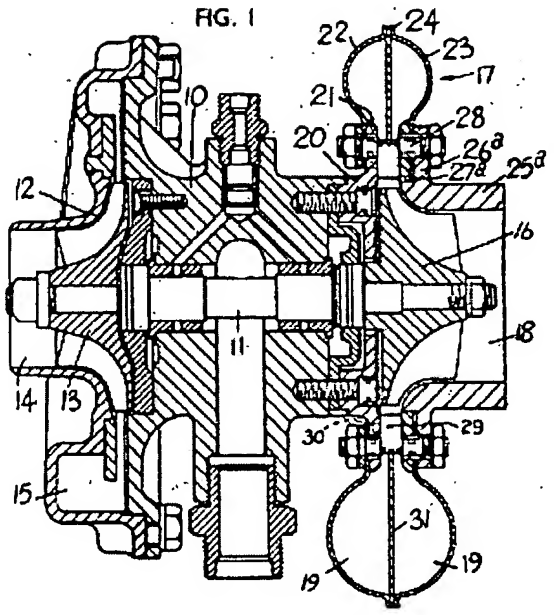
Abstract of **GB1199158**

1,199,158. Turbine casings; charging I.C. engines. C.A.V. Ltd. Nov.23, 1967 [Nov. 25, 1966], No.52897/66. Headings F1B; F1G and F1T. A casing for a radial-flow turbine of a turbo-supercharger for an I.C. engine, comprises two sheet steel pressings 22, 23 welded together and to an annular partition 31 at their outer peripheries and secured to a supporting portion 20 and an out- let portion 25a of the casing by studs 28. The studs have guide vane portions 29 having locating pins 30 and formed with grooves for receiving the inner periphery of the partition 31. The latter divides the inlet volute into two passages 19 each having its own inlet from the exhaust manifold of the engine.



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1,199,158

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,199,158

Inventor: ERIC KELLETT

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International Classification:—F 01 d 9/02, 25/24

COMPLETE SPECIFICATION

Casings for Radial Flow Fluid Turbines e.g. of Turbo-Superchargers for I.C. Engines

We, C.A.V. LIMITED of Warple Way, Acton, London, W.3, a British Company, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to casings for radial flow fluid turbines e.g. of turbo-superchargers for I.C. engines, and of the kind comprising a mounting portion whereby the casing can be mounted on a supporting body, an annular portion which defines a fluid outlet and which is shaped on its internal periphery in a manner complementary to the turbine blades of the associated rotor and an annular fluid conveying portion which is provided with a fluid inlet, and which defines a pair of fluid conveying passages.

In the past it has been the practice to form the casing as a casting but when the casing is formed as a casting, it is difficult to make the surface of the fluid conveying passages smooth enough to ensure that the flow of fluid when the turbine is in use, is not impaired. Moreover, there are other disadvantages with cast casings, such for example, as weight and expansion problems when hot fluids are used, and it is an object of this invention to provide a casing in a form in which these disadvantages are minimised.

In the accompanying drawings:—

Figure 1 is a sectional side elevation of a turbo-supercharger for an internal combustion engine and employing one example of a casing manufactured in accordance with the invention,

Figure 2 is a perspective view on an enlarged scale of part of the turbo-supercharger of Figure 1, and

Figure 3 is a plan view of one half of the casing of Figure 1.

As shown in Figure 1 of the drawings the turbo-supercharger comprises a body part 10 in which is mounted a rotary shaft 11. At one end of the shaft there is mounted a compressor rotor 13 which is housed within a compressor casing 12 secured to the body part. The casing 12 defines an air inlet 14 and the outlet is defined by an annular passage 15 opening to the periphery of the rotor 13. In use, the passage 15 is connected to the air inlet manifold of the associated engine to supply air under pressure thereto. At the opposite end of the shaft is secured a turbine rotor 16 which is housed within a casing generally referenced 17. The casing defines an exhaust gas outlet 18 and annular passages 19 opening along their length onto the periphery of the rotor 16. The annular passages 19 have their own inlet from the exhaust manifold of the engine and the arrangement is such that flow of exhaust gases drives the turbine rotor 16 which in turn drives the compressor rotor 13.

The turbine casing 17 together with its associated supporting structure will now be described. Again with reference to Figure 1 there is provided an annular mounting portion 20 which is secured by a series of threaded bolts to the body part 10. The portion 20 is provided with a radially outwardly extending flange 21 in which is formed a plurality of holes which in the particular example are equiangularly spaced about the axis of rotation of the shaft.

The body portion of the casing 17 comprises a pair of complementary generally annular pressings 22, 23 formed from steel sheet capable of withstanding the high temperature to which they will be subjected when in use. One of the pressings is shown in plan view in Figure 3. Each pressing has an outwardly extending flange 24 and an inwardly extending flange 25. The flange 25 is provided with a plurality of holes 26 positioned for registration with the holes formed in the flange 21 of the mounting portion 20. Intermediate the flanges 24 and 25 there is defined a recess 27 which

is in the form of a volute which reduces in size from an extension piece 28*a*. Located between the pressings is a generally annular division plate 31 which together with the recesses 27 in the pressings defines the annular passages 19.

Also provided is an annular outlet portion 25*a* which defines the exhaust gas outlet 18 and which is shaped to correspond with the periphery of the blades of the turbine rotor 16. The outlet portion is provided with an outwardly extending flange 26*a* which is provided with holes in registration with the holes 26 in the flanges 25 of the pressings. The flange 26*a* of the portion 25*a* is recessed on its face directed towards the mounting portion 20, to provide accommodation for a ring 27*a*. Moreover, to secure the parts of the casing together studs 28 are provided. One of these studs is illustrated in perspective in Figure 2 of the drawings and as shown it comprises threaded end portions at the inner ends of which are cylindrical portions respectively and intermediate the cylindrical portions is a vane 29 having on one of its side faces a locating pin 30.

The assembly of the casing 17 will now be described. Firstly the pressing 22 is secured to the flange 21 of the mounting member by means of the studs 28 and during the fitting of the studs the division plate 31 is located within grooves formed in the studs. The ring 27*a* is then engaged upon the studs followed by the pressing 23 and the flanges 24 and the outer periphery of the division plate are welded together. The mounting portion 20 is then secured to the body part 10 and the turbine rotor 16 is mounted upon the shaft and finally the outlet portion 25*a* is secured by the studs to form a composite structure. The locating pins 30 in the vanes 29 engage within blind holes formed in the flange 21 of the mounting portion and the vanes serve to direct the exhaust gases onto the turbine rotor.

WHAT WE CLAIM IS:—

1. A casing for a radial flow fluid turbine of the kind specified comprising a pair of generally annular pressings of sheet material which are secured together at their outer peripheries, said pressings defining radially inwardly extending flange portions respectively, a plurality of studs serving to secure the flange portions to the mounting portion and annular portion respectively, an annular division plate mounted between the two pressings, said division plate being secured at its outer periphery to the pressings and being located at its inner periphery within grooves formed in said studs, said division plate and said pressings defining the pair of fluid conveying passages.

2. A casing as claimed in claim 1 in which said studs define vanes to guide the flow of fluid into the rotor.

3. A casing for a radial flow turbine and comprising the combination and arrangement of parts substantially as herein described with reference to and as shown in Figures 1, 2 and 3 of the accompanying drawings.

4. A turbo-supercharger for an internal combustion engine and comprising the combination and arrangement of parts substantially as herein described with reference to and as shown in Figures 1, 2 and 3 of the accompanying drawings.

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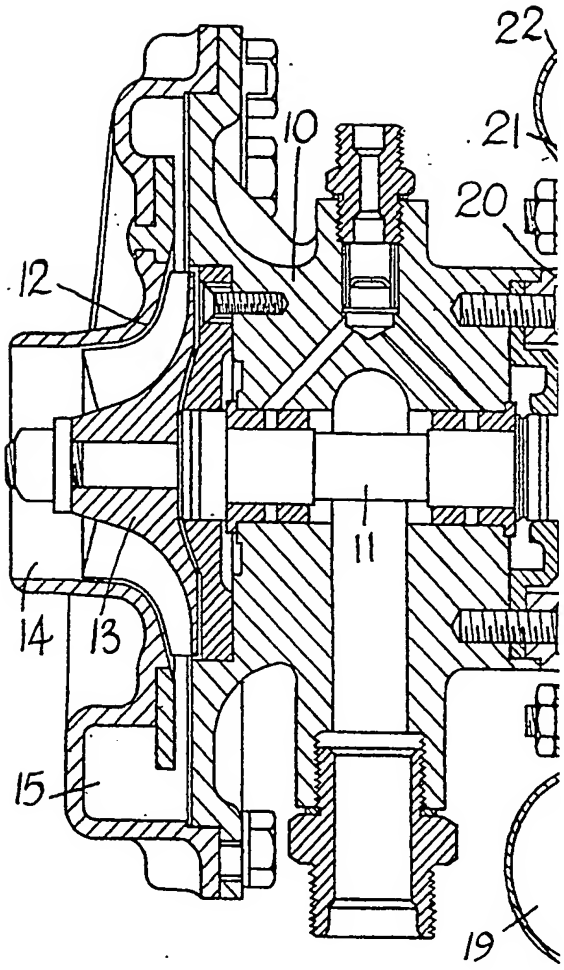

FIG. 1.

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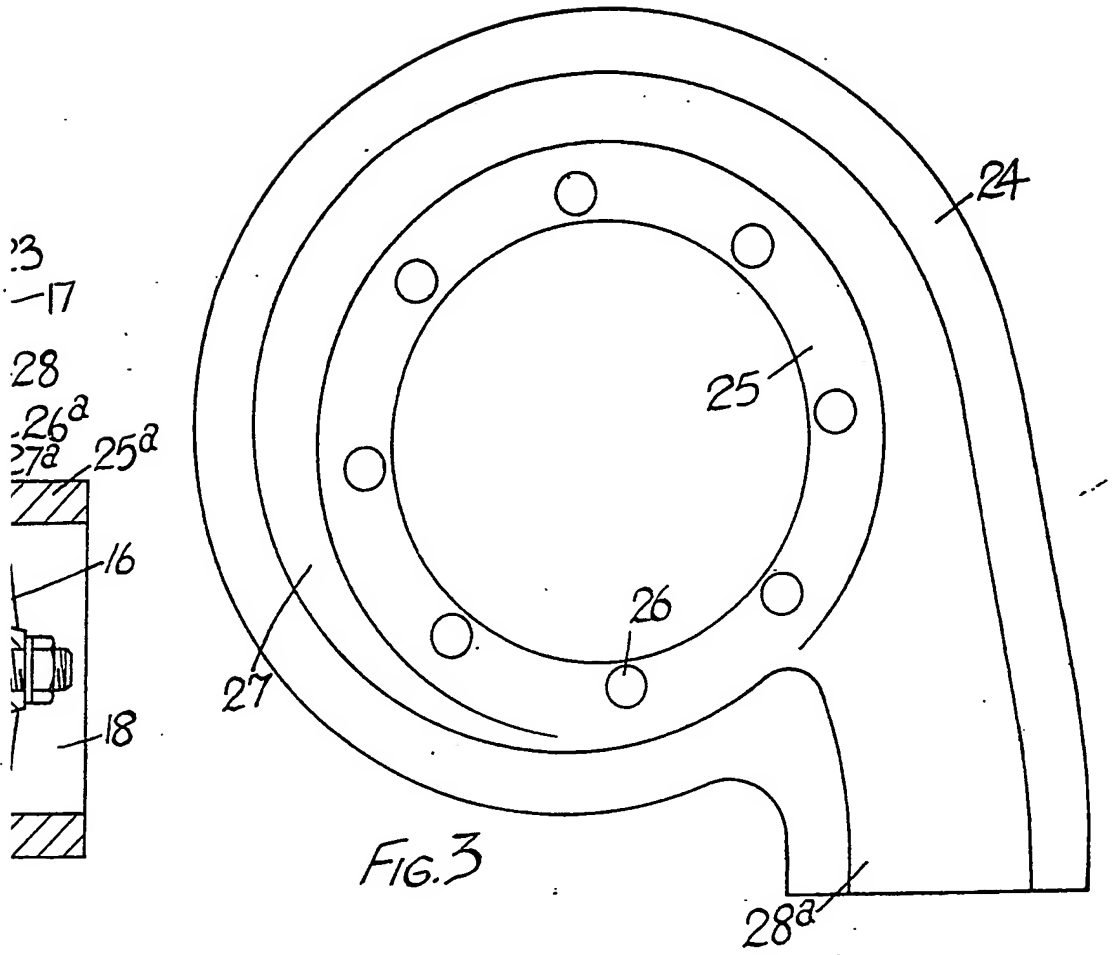

FIG. 3

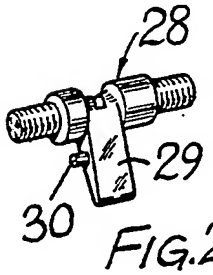

FIG. 2

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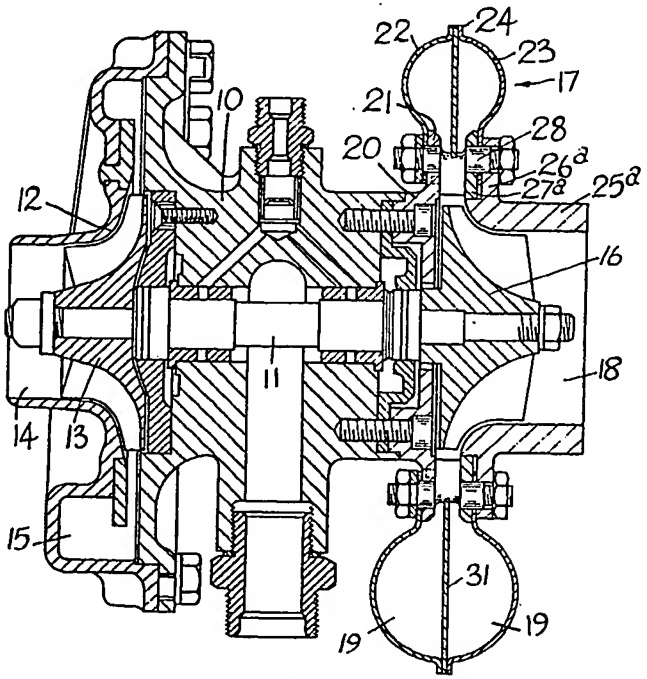

FIG.1.

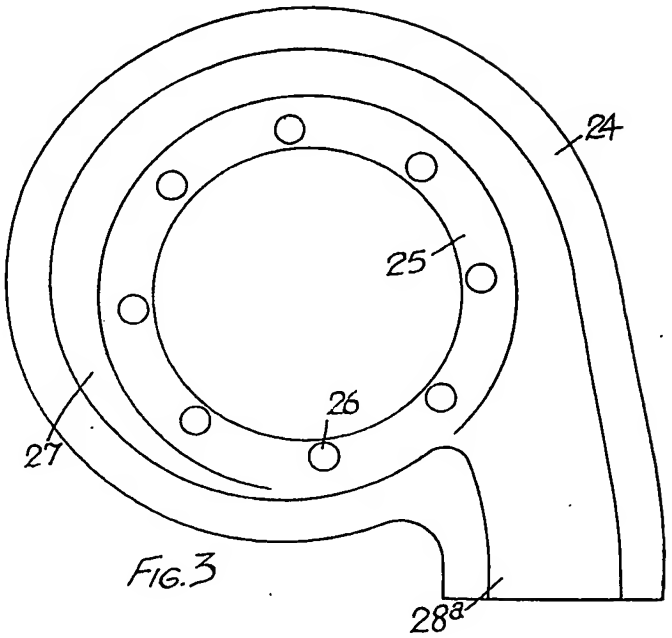

FIG.3

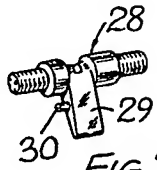

FIG.2